

Standardized Infection Ratio (SIR) Table

Device-Associated Infections

Description

The standardized infection ratio is a risk-adjusted summary measure that compares the observed number of infections to the expected number of infections based on NHSN aggregate data. This document explains how to calculate and interpret the SIR for device-associated infections. The example below is for CLABSI, but the CAUTI SIR is calculated and interpreted in a similar manner.

Example

Below is an example of an SIR table for CLABSI surveillance that occurred in neonatal critical care locations in 2011 grouped by half-year (6-month, calendar half-year).

Modification Page

Analysis SIR

Analysis Data Set: CLAB_RatesICU [Export Analysis Data Set](#)

Modify Attributes of the Output:

Last Modified On: 01/09/2012

Output Type: SIR

Output Name: SIR - All CLAB Data

Output Title: SIR for All Central Line-Associated BSI D

Select output format:

Output Format: HTML

☒ Use Variable Labels

Select a time period or Leave Blank for Cumulative Time Period:

Date Variable Beginning Ending

summaryYr 2011 2011 [Clear Time](#)

☐ Enter Date variable/Time period at the time you click the Run button

Specify Other Selection Criteria:

[Show Criteria](#) [Column +](#) [Row +](#) [Clear Criteria](#)

locationType		
= CC_N		

Other Options:

Group by: summaryYH

[Run](#) [Save As](#) [Reset](#) [Back](#) [Export Output Data Set](#)

Top Section of Modification Page:

- In the top section of the modification page, you can modify the name, title, and output format of the SIR table. Note: If you wish to save your modifications as a template for future reports, you will be required to change the output name.

Tip: For more descriptive variable labels on your SIR table, check the box to "Use Variable Labels" (recommended).

Middle Section of Modification Page:

- In the middle sections of the page, you can filter output by time period or other criteria (e.g., limit to a single location type).
- In this example of a CLABSI SIR, we have limited the SIRs to include only events and summary data for 2011 (summaryYr=2011) and from a single location type (locationType=CC_N).
- For additional details about how to use this section, see the additional resources listed on page 2.

Bottom Section of Modification Page:

- The "Group by" option found at the bottom of the page allows you to view SIRs by month, quarter, half-year, or year. Leave the option blank to see a cumulative SIR for the time period you have specified above.
- In this example, we will produce SIRs for each calendar half-year of 2011 (i.e., 6 month time period) by selecting the Group By variable "summaryYH".

Output/Results and Interpretation

National Healthcare Safety Network

SIR for All Central Line-Associated BSI Data - By OrgID

As of: February 29, 2012 at 10:44 AM

Date Range: CLAB_RATESALL summaryYr 2011 to 2011

if (((locationType = "CC-N")))

Org ID	Summary Yr/Half	infCount	Number Expected	Central Line Days	SIR	SIR p-value	95% Confidence Interval
10018	2011H1	1	1.356	571	0.737	0.6071	0.019, 4.109
10018	2011H2	0	0.070	30	.	.	

If infCount in this table is less than you reported, aggregate data are not available to calculate numExp.

Lower bound of 95% Confidence Interval only calculated if infCount > 0. SIR values only calculated if numExp >= 1.

SIR excludes those months and locations where device days are missing.

Source of aggregate data: NHSN Report, Am J Infect Control 2009;37:783-805

Data contained in this report were last generated on January 9, 2012 at 3:41 PM.

- This facility reported 1 central line-associated BSI (infCount) in the neonatal critical care location (locationType="CC-N") during the first half of 2011. This is the observed number of CLABSIs.
- For each time period, the number of expected (or predicted) CLABSIs ("Number Expected") is calculated by multiplying each location's number of central line days by the NHSN pooled mean and dividing by 1000. The number expected for each location is then summed to result in the overall number expected.
- The SIR is the number of observed CLABSIs (numerator) divided by the number of expected CLABSIs (denominator); in this example, $1/1.356 = 0.737$. An SIR will only be calculated if the number of expected infections is ≥ 1 . When the expected number of infections is < 1 , it is considered too low to calculate a precise SIR and comparative statistics. Note that this is the case for the second half of 2011 in our example. When this occurs, you may wish to group your SIRs by a longer time period, such as calendar year (summaryYr).
- The SIR p-value is a statistical measure that tells you if the observed number of infections is significantly different from what was expected. A p-value less than 0.05 (an arbitrary and conveniently used cut point) indicates that the number of observed CLABSIs is statistically significantly different (higher or lower) from the number expected. In this example, the p-value for the first half of 2011 is greater than 0.05 and thus there is no significant difference between the number of infections observed and the number of infections expected.
- The 95% Confidence Interval is a range of values in which the true SIR is thought to lie, however the SIR reported under the SIR column is the most likely value. If the confidence interval includes the value of 1 (as in this example), then the SIR is not significant (the number of observed infections is not significantly different from the number expected, using the same convenient cut point). The statistical evidence should be interpreted as insufficient to conclude that the SIR is different than 1.

Additional Resources:

Introduction to NHSN Analysis: <http://www.cdc.gov/nhsn/PDFs/training/intro-AnalysisBasics-PSC.pdf>

How to filter your data by time period: <http://www.cdc.gov/nhsn/PS-Analysis-resources/PDF/FilterTimePeriod.pdf>

How to filter your data on additional criteria: <http://www.cdc.gov/nhsn/PS-Analysis-resources/PDF/SelectionCriteria.pdf>

NHSN Newsletter: Your Guide to the Standardized Infection Ratio:

http://www.cdc.gov/nhsn/PDFs/Newsletters/NHSN_NL_OCT_2010SE_final.pdf